

**CLAIMS:**

1. A method for assessing a spatial regularity of reflecting members in a tissue, comprising steps of:
  - 5 (a) irradiating the tissue;
  - (b) detecting waves reflected by the tissue; and
  - (c) calculating one or more parameters indicative of a degree of spatial disorder of reflecting members in the tissue based upon the reflected waves.
- 10 2. The method of Claim 1 wherein the tissue is irradiated with a form of radiation selected from the group comprising:
  - (a) sonic radiation; and
  - (b) electromagnetic radiation.
- 15 3. The method of Claim 2 wherein the tissue is irradiated in a procedure selected from the group comprising:
  - (a) an ultrasound procedure;
  - (b) a CT procedure; and
  - (c) an MRI procedure.
- 20 4. The method of Claim 1 wherein the one or more parameters are obtained in a calculation based upon complex raw data obtained from the detected reflected waves.
5. The method of Claim 4 wherein the one or more parameters are obtained in a calculation involving an analysis selected from the group of:
  - (a) a Fourier analysis of the complex raw data;
  - (b) a wavelet analysis of the complex raw data; and
  - 25 (c) an entropy analysis of the complex raw data.
6. The method of Claim 1 further comprising a step of generating an image of the tissue based upon the detected reflected waves and wherein the one or more parameters are obtained in a calculation based upon the image.
7. The method of Claim 6 wherein the parameter is obtained in a calculation involving an analysis selected from the group of

- (a) a Fourier analysis of the image;
- (b) a wavelet analysis of the image; and
- (c) an entropy analysis of the image.

8. A method for determining whether a tissue is malignant comprising steps of;

- 5 (a) irradiating the tissue;
- (b) detecting waves reflected by the tissue;
- (c) calculating a parameter indicative of a degree of spatial disorder of reflecting members in the tissue based upon the reflected waves; and
- (d) comparing the parameter to a predetermined threshold;

10 the tissue being malignant if the parameter exceeds the predetermined threshold.

9. A method for determining whether a tissue is malignant comprising steps of;

- (a) irradiating the tissue;
- (b) detecting waves reflected by the tissue;
- 15 (c) calculating one or more parameters indicative of a degree of spatial disorder of reflecting members in the tissue based upon the reflected waves; and
- (d) inputting the one or more parameters into an expert system so as to generate an assessment as to whether the tissue is malignant.

20 10. The method according to Claim 9 wherein the expert system is a neural network.

11. A system for assessing a spatial regularity of reflecting members in a tissue, comprising:

- 25 (a) a wave source configured to irradiate the tissue;
- (b) a wave detector configured to detect waves reflected by the tissue; and
- (c) a processor configured to calculate a parameter indicative of a degree of spatial disorder of reflecting members in the tissue based upon the reflected waves.

12. The system of Claim 11 wherein the wave source is configured to irradiate the tissue with a form of radiation selected from the group comprising:
  - (a) sonic radiation; and
  - (b) electromagnetic radiation.
- 5 13. The system of Claim 12 configured to carry out a procedure selected from the group comprising:
  - (a) an ultrasound procedure;
  - (b) a CT procedure; and
  - (c) an MRI procedure.
- 10 14. The system of Claim 11 wherein the parameter is obtained in a calculation based upon complex raw data obtained from the detected reflected waves.
- 15 15. The system of Claim 14 wherein the parameter is obtained in a calculation involving an analysis selected from the group of:
  - (a) a Fourier analysis of the complex raw data;
  - (b) a wavelet analysis of the complex raw data; and
  - (c) an entropy analysis of the complex raw data.
16. The system of Claim 11 wherein the processor is further configured to generate an image of the tissue based upon the detected reflected waves and wherein the parameter is obtained in a calculation based upon the image.
- 20 17. The system of Claim 16 wherein the parameter is obtained in a calculation involving an analysis selected from the group of:
  - (a) a Fourier analysis of the image;
  - (b) a wavelet analysis of the image; and
  - (c) an entropy analysis of the image.
- 25 18. A system for determining whether a tissue is malignant comprising:
  - (a) a wave source configured to irradiate the tissue;
  - (b) a wave detector configured to detect waves reflected by the tissue;
  - (c) a processor configured to calculate a parameter indicative of a degree of spatial disorder of reflecting members in the tissue based upon the reflected waves.

19. The system of Claim 18 wherein the processor is further configured to compare the parameter to a predetermined threshold.
20. A method for determining whether a tissue is malignant comprising steps of;
  - 5 (a) irradiating the tissue;
  - (b) detecting waves reflected or scattered by the tissue;
  - (c) performing an analysis of the reflected or scattered waves;
  - (d) inputting the results of the analysis into an expert system.
21. The method of Claim 20 wherein the analysis involves one or more processes selected from the group of;
  - 10 (a) a Fourier analysis of the complex raw data;
  - (b) a wavelet analysis of the complex raw data; and
  - (c) an entropy analysis of the complex raw data..
22. A method for generating an image of the tissue, comprising steps of;
  - 15 (c) irradiating the tissue;
  - (d) detecting waves reflected by the tissue; and
  - (e) performing a non-Fourier analysis of the detected waves so as to produce an image of the tissue.
23. The method of Claim 22 wherein the non-Fourier analysis is a minimum variance method.